ABSTRACT

The present invention provides a particle identification apparatus including a flow cell for passage of fluid containing a population of labeled magnetic microspheres in a stream, the magnetic microspheres having a label providing a detectable property to the magnetic microspheres, and, a magnetic measurement system, positioned adjacent to the flow cell, for measuring a magnetic moment on each labeled magnetic microsphere as it passes by the magnetic measurement system. The present invention also provides a particle sorting apparatus including a chamber having an inlet for a fluid suspension of a population of magnetic microspheres to be sorted, a magnetic field generator that produces a field gradient across the chamber for producing a force on the magnetic microspheres within the fluid suspension, a series of collection bins positioned within the chamber for receiving magnetic microspheres with distinctly different magnetic moments as a result of movement of the magnetic microspheres resulting from the force produced on the magnetic microspheres within the fluid suspension by magnetic field gradient; and, an outlet for fluid flow. The present invention also provides a kit for sorting and identifying a material within a sample, the kit including a population of magnetic microspheres each having a distinctly measurable magnetic moment, with each individual magnetic microsphere also having one or more receptor agents attached thereto, and, a population of non-magnetic microspheres, with each individual non-magnetic microsphere also having one or more receptor agents attached thereto. The present invention also provides a kit for sorting and identifying a material within a sample, the kit including at least two populations of magnetic microspheres each population having a distinctly different measurable magnetic moment.